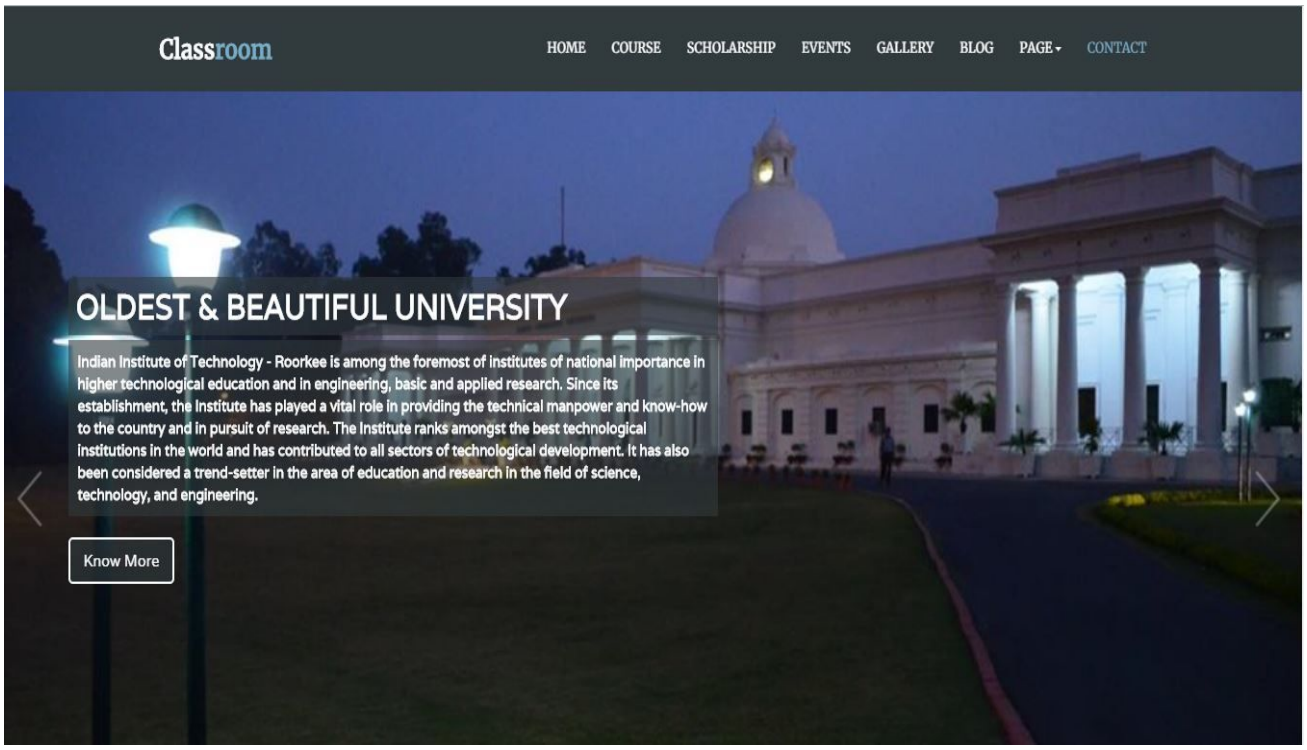
Database Management System

Course Project

Project No: 2D

MockCollege Database

GithubLink: https://github.com/msharsha555/Classroom



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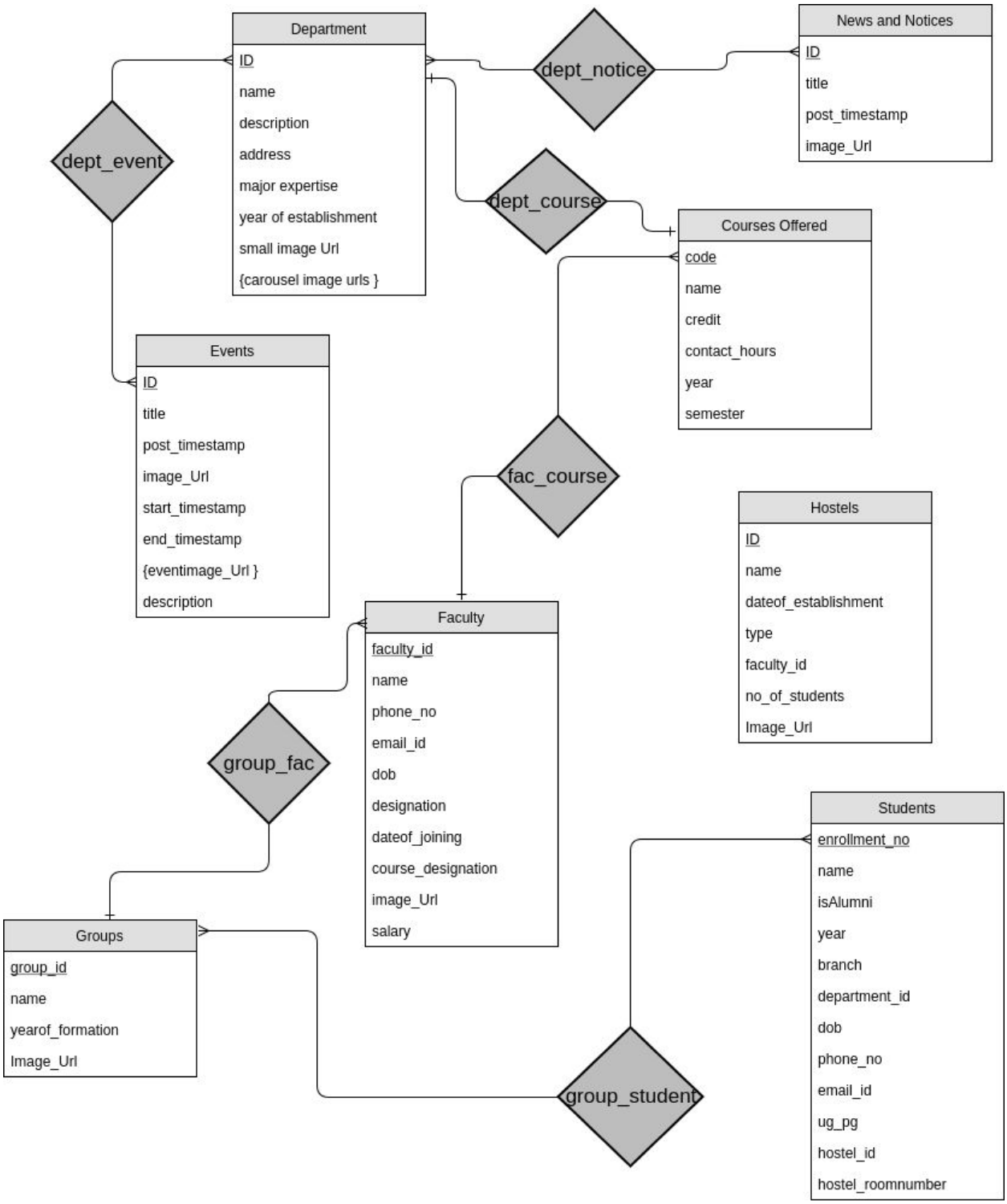
ER Diagram :


Department
ID
name
description
address
major expertise
year of establishment
small image Url
{carousel image urls }
News and Notices
ID
title
post_timestamp
image_Url
dept_notice
dept_event
dept_course
Courses Offered
code
name
credit
contact_hours
year
semester
Events
ID
title
post_timestamp
image_Url
start_timestamp
end_timestamp
{eventimage_Url }
description
fac_course
Hostels
ID
name
dateof_establishment
type
faculty_id
no_of_students
Image_Url
Faculty
faculty_id
name
phone_no
email_id
dob
designation
dateof_joining
course_designation
image_Url
salary
group_fac
Students
enrollment_no
name
isAlumni
year
branch
department_id
dob
phone_no
email_id
ug_pg
hostel_id
hostel_roomnumber
Groups
group_id
name
yearof_formation
Image_Url
group_student

Initial Schemas :

Department: (
ID, name, description, address, major expertise, year of establishment, small image Url, {carousel image urls}
)

News and Notices : (
ID, title, post timestamp, image Url, description
)

Dept_notice: (
d_id, n_id
)

Events: (
ID, title, post timestamp,central_image Url, event start timestamp, event end timestamp,description,{event_image Url}
)

Dept_event: (
d_id, e_id
)

Courses: (
D_id, code,faculty_id, name, credit, contact hours, year, semester
)

Faculty: (
Group_id,faculty id, name, phone no., email id, dob, designation, date of Joining, course_specialization, image URl, salary
)

Groups: (
group id, name, year of formation
)

Students: (
enrollment no., name, isAlumni, year, branch, department Id, dob, phone no. Email Id, ug_pg, hostel Id, hostel room number
)

Hostel : (
Id, name, date of establishment, type,faculty Id, Number of students, Image Url
)

NOTE :

In Group entity,{student_id} is not needed if u want to represent a relationship there.Similarly for the group_id in Students. Also there is no need of representing a many to one relationship between Students and Hostel as hostel_is is already present in the entity.

The above are the obtained schemas with the corresponding primary keys.

The FDs that can be inferred from the schemas are :

Department:

- *Id -> name, description, address, major expertise, year of establishment, small image Url, {carousel image urls}*

There is no FD where the left hand side is not a primary key.ID is the primary key.

News and Notices :

- *Id -> title, post timestamp, image Url, description*

There is no FD where the left hand side is not a primary key.ID is the primary key.

Dept_event :
There is no FD where the left hand side is not a primary key.(e_id,d_id) is the primary key.All attributes form the candidate key.

Dept_notice:
There is no FD where the left hand side is not a primary key.(d_id,n_id) is the primary key.All attributes form the candidate key.

Events :

- *Id -> title, post timestamp, image Url, event start timestamp, event end timestamp* and *description*

There is no FD where the left hand side is not a primary key.ID is the primary key.

Courses:

- { D_id, code, faculty_id } -> name, credit, contact hours, year, semester

There is no FD where the left hand side is not a primary key.code is the primary key.

Faculty :

- { Group_id,faculty id } -> name, phone no., email id, dob, designation, date of Joining, course specialization, image URI, salary

There is no FD where the left hand side is not a primary key.faculty_id is primary key.

Groups :

- group id -> name, year of formation

There is no FD where the left hand side is not a primary key.group_id is the primary key.

Students:

- enrollment no. -> name, isAlumni, year, branch, department Id, dob, phone no. Email Id, ug_pg, hostel Id, hostel room number

There is no FD where the left hand side is not a primary key.enrollment_no is the primary key.

So from the above FDs we can say that only 1NF normalisation would suffice and after that all the schemas are in 5NF.

1 NF needs to be done in Department and Events.

So, the new schemas formed are

Dept_images : (
d_ID,carousel_image Url
)

Event_images : (
e_ID,event_image Url
)

The present FDs is the minimal closure and we don't need to do any furtherprocessing.

Hence , the final schemas along with the attribute initialisations are -

Department
{
ID varchar(20)
Name varchar(50)
Description varchar(2000)
Address varchar(100)
major expertise varchar(50)
year of establishment int(4)
small image Url varchar(100)
Primary key ID
}

News
{
ID varchar(20)
Title varchar(20)
Post timestamp TIMESTAMP
Description varchar(2000)
image Url varchar(100)
Primary key ID
}

Dept_notice

{

d_ID varchar(20)

n_ID varchar(20)

Primary key (d_ID,n_ID)

Foreign key d_ID references Department

Foreign key n_ID references News

}

Events

{

ID varchar(20)

Title varchar(20)

post timestamp TIMESTAMP

central_image Url varchar(100)

event start timestamp TIMESTAMP

event end timestamp TIMESTAMP

Description varchar(2000)

Primary key ID

}

Dept_event

{

e_ID varchar(20)

d_ID varchar(20)

Primary key (e_ID,d_ID)

Foreign key e_ID references Events

Foreign key d_ID references Department

}

Courses

{

d_ID varchar(20)

Code varchar(20)

Faculty_id varchar(20)

Name varchar(50)

Credit int(10)

contact hours number(6,2)

Year int(10)
Semester int(10)
Primary key (d_ID,Code,Faculty_id)
Foreign key d_ID references Department
Foreign key faculty_id references Faculty
}

Faculty
{
Group_id varchar(20)
faculty_id varchar(20)
Name varchar(50)
phone no. varchar(20)
email id varchar(100)
Dob TIMESTAMP
Designation varchar(2000)
date of Joining TIMESTAMP
Course_specialization varchar(20)
image URI varchar(100)
salary int(20)
Primary key (faculty_id,Group_id)
Foreign key Group_id references Group
}

Groups
{
Group_id varchar(20)
Name varchar(50)
year of formation int(20)
Primary key group_id
}

Student
{
enrollment no. varchar(20)
name varchar(50)
isAlumni boolean
Year numeric(4,0)
Branch varchar(20)

department Id varchar(20)
Dob TIMESTAMP
phone no varchar(20)
Email Id varchar(100)
Ug_pg varchar(20)
hostel Id varchar(20)
hostel room number int(20)
Primary key enrollment_no
Foreign key (department_id,hostel_id) references (department,hostel)
}

Dept_images

{
d_ID varchar(20)
carousel_image Url varchar(100)
Primary key (d_ID,carousel_image)
Foreign key d_ID references Department
}

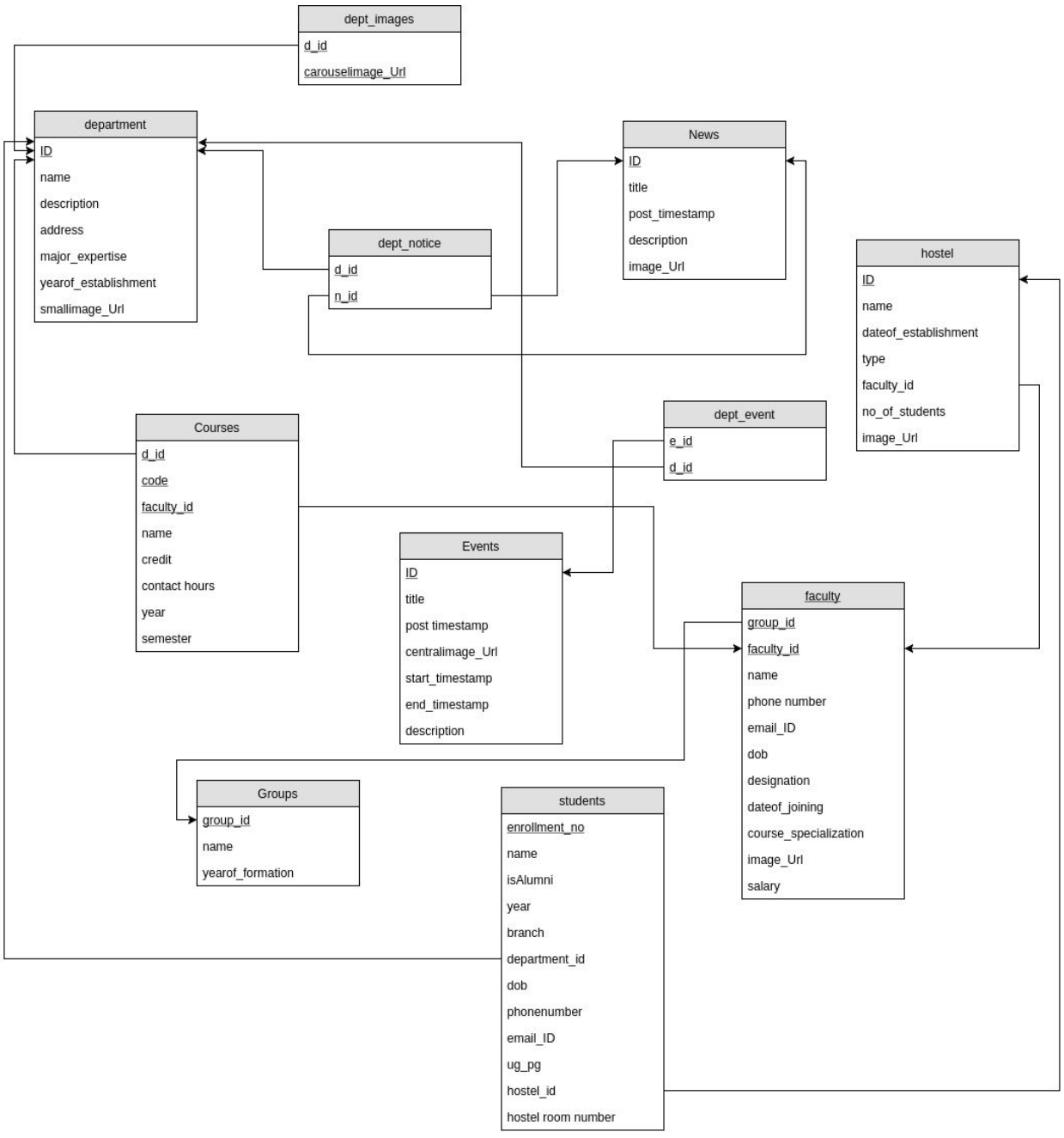
Event_images

{
e_ID varchar(20)
event_image Url varchar(100)
Primary key (e_ID,event_image)
Foreign key e_ID references Event
}

Hostel

{
ID varchar(20)
Name varchar(50)
date of establishment TIMESTAMP
Type varchar(10)
faculty Id varchar(20)
Number of students int(20)
Image Url varchar(100)
Primary key ID
Foreign key faculty id references Faculty
}

Final Schema Diagram :



2NF, 3NF, BCNF 4NF, 5NF?

Observation: In all our tables, we have FDs of type X -> A, X ∈ Candidate Key.

2NF:

Since X ∈ Candidate Key, no non-prime attribute can be dependent on a subset of candidate key.

3NF:

Since X ∈ Candidate Key, there cannot be a functional dependency from non-prime attribute to non-prime attribute

BCNF:

Since X ∈ Candidate Key ∈ Super Key, this means all our tables are in BCNF.

Since there are no multi-valued dependencies or Join Dependencies, the schema is in **5NF**